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10/030,240	05/17/2002	Alan Edward Green	08364.0032	5877
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FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413				
			EXAMINER WANG, QUAN ZHEN	
			ART UNIT 2633	PAPER NUMBER

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Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/030,240

Applicant(s)

GREEN ET AL.

Examiner

Quan-Zhen Wang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 May 2002.  
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 37-86 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 37-86 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 1/8/02.  
 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_  
 5) ☐ Notice of Informal Patent Application (PTO-152)  
 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 37, 41-44, 52-53, 55-57, 59-62 are rejected under 35 U.S.C. 102(e) as being anticipated by Takamatsu (U.S. Patent US 5,822,099).

Regarding claims 37, 63, and 80, Takamatsu teaches an optical signaling system (fig. 3) comprising first (fig. 3, element 40) and second (fig. 3, element 50) signaling devices, the first signaling device comprising a plurality of signaling elements each having a common signaling function (fig. 7, elements 137), the signaling elements being arranged in a predetermined spatial configuration with gaps therebetween (fig. 7, spaces between elements 137), and a second signaling device comprising at least one signaling element (fig. 3, receiver 44) for signaling with at least one of the signaling elements of said first signaling device, and wherein said first signaling device further comprises at least one additional optical element (fig. 7, element 136) arranged to reduce the apparent size of the gaps between adjacent elements.

Regarding claims 41-44, 67-70, Takamatsu further teaches that the signaling elements are arranged in an array (fig. 7).

Regarding claims 49, 75, Takamatsu further teaches that the plurality of signalling elements comprises an array of light emitters (fig. 7).

Regarding claims 52-53, Takamatsu further teaches that the second signaling device comprises a plurality of signaling elements and the plurality of said signaling elements in said second signaling device are arranged in a regular array (fig. 7).

Regarding claim 55-56, Takamatsu further teaches that the signaling elements of said second signaling device comprises a light detector (fig. 5, element 57), and a photodiode is a well-known light detector.

Regarding claim 57, the first and second signaling devices in the system of Takamatsu are inherently moveable relative to each other.

Regarding claims 59 and 60, Takamatsu further teaches that the system comprising: a plurality of said first signaling devices arranged to signal with one or more of said second signaling devices; a plurality of said second signaling devices each arranged to signal with a respective one of said signaling elements of said first signaling device (figs. 3 and 7).

Regarding claims 61 and 62, Takamatsu further teaches that the signaling elements of said first signaling device are operable to modulate an optical signal to be transmitted to said second signaling device (fig. 3, light emission driving control 42).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 40-44, 52-53, and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamatsu (U.S. Patent US 5,822,099).

Regarding claims 40, 66, Takamatsu has been discussed above in regard with claim 37. The system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the system comprising at least one additional optical element comprises a second plurality of signaling elements each having the same signaling function as the signaling elements of the first plurality of signaling elements, the second plurality of signaling elements being arranged in a predetermined spatial configuration with gaps therebetween, the second plurality of signaling elements being offset at an angle relative to the first plurality of signaling elements. However, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a second plurality of signaling elements each having the same signaling function as the signaling elements of the first plurality of signaling elements, the second plurality of signaling elements being arranged in a predetermined spatial configuration with gaps therebetween, the second plurality of signaling elements being offset at an angle relative to the first plurality of signaling elements, since it has been held that mere duplication of the essential working parts of

a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claims 41-44, Takamatsu teaches that the A system according to claim 37, wherein the plurality of signaling elements are arranged in an array (fig. 7).

Regarding claim 52, Takamatsu has been discussed above in regard with claim 37. The system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the second signaling device comprises a plurality of signaling elements. However, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a plurality of signaling elements, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 53, Takamatsu teaches that the plurality of signaling elements are arranged in an array (fig. 7).

Regarding claim 79, Takamatsu teaches a signaling kit (fig. 3) comprising one first (fig. 3, 40) and second signaling devices (fig. 3, 50), and the first device signaling with the second device (fig. 3, signals between the first and second device. The system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that kit comprising a plurality of second signaling devices. However, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a plurality of second devices in the communication kit, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

5. Claims 38, 45-48, 58, 71-74, and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamatsu (U.S. Patent US 5,822,099) in view of Rosenberg (U.S. Patent US 5,815,624).

Regarding claims 38, 58, 64, 78, the system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the one additional optical element comprises a corresponding plurality of microlenses positioned in front of the signaling elements. However, microlenses are well known in the art. For example, Rosenberg discloses using a plurality of microlenses (planar microlens array) (figs. 3 and 4, PML) to reduce apparent gaps between individual fibers 48, 50, and 52. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use a plurality of microlenses in the system of Takamatsu, as it is taught by Rosenberg, to reduce apparent gaps between signaling elements and increase average packing density of the plurality of signaling elements.

Regarding claims 45, 71, the system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that lens system is provided in front of the device. However, Rosenberg teaches that the lens system is provided in front of the device. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a lens system in front of the device, as it is taught by Rosenberg, in the system of Takamatsu in order to increase the transmitting and receiving efficiency.

Regarding claims 46, 72, Rosenberg further teaches that wherein the lens system of said first signaling device comprises a telecentric lens (fig. 5A).

Regarding claims 47, 73, Rosenberg further teaches that the devices are located substantially at the back focal plane of said telecentric lens (figs. 3 and 5A).

Regarding claims 48, 74, the modified system differs from the claimed invention in that Takamatsu and Rosenberg do not specifically teach that the telecentric lens is a wide angled telecentric lens. However, the Examiner takes Official Notice that a wide angled telecentric lens is well known in the art. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use a wide angled telecentric lens in the system in order to increase the acceptance angle of the signal.

6. Claims 39 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamatsu (U.S. Patent US 5,822,099) in view of Orino (U.S. Patent US 5,689,354).

Regarding claims 39, 65, the system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the at least one additional optical element comprises at least one beam splitter, wherein said plurality of signaling elements are arranged in at least two groups and wherein the at least one beamsplitter and the at least two groups are arranged so that the signaling elements of the at least two groups are effectively spatially interleaved with one another. However, a beamsplitter is one of the basic optical elements which are well known in the art. For



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example, Orino discloses using a beamsplitter (fig. 4, beamsplitter 5) to split one beam into two. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to employ a beamsplitter in the system of Takamatsu, as it is taught by Orino, to split the beam into two and configure the signalling elements of the at least two groups such that they are interleaved.

7. Claims 50-51, 76-77, and 82-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takamatsu (U.S. Patent US 5,822,099) in view of Gould et al. (U.S. Patent US 4,777,660).

Regarding claims 50, 76, Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the plurality of signaling elements comprises an array of light reflectors. However, it is well known in the art to use light reflector in a signaling elements. For example, Gould discloses a signaling system using light reflectors (figs. 1-3). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use light reflectors in the signaling system of Takamatsu, as it is taught by Gould, in order to send response signal back to original transmitting signaling device of the system.

Regarding claims 51, 77, Gould further teaches that the signaling device further comprises a modulator operable to modulate light reflected by the reflector (fig. 2).

Regarding claims 81, 82, and 86, Takamatsu teaches an optical signaling system (fig. 3) comprising first and second signaling devices, the first signaling device comprising an optical signal generator (fig. 3, element 47) operable to generate an

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optical signal, a modulator (fig. 3, element 42) operable to modulate the generated optical signal with modulation data; the second signaling device comprising a receiver (fig. 3, element 44) operable to receive optical signals transmitted from the first signaling device, a data retriever operable to retrieve the modulation data from the received signal (fig. 3, element 45). The system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the first device comprising a reflector operable to reflect the generated optical the first signaling signal towards said second signaling device. However, it is well known in the art to use a reflector to reflect the generated optical signal from a transmitting signaling device towards a receiving signaling device. For example, Gould teaches using a reflector (fig. 1, reflector 25) to reflect the generated optical signal from a transmitting signaling device towards a receiving signaling device. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a reflector, as it is taught by Gould, in the system of Takamatsu in order to increase the flexibility of the signal alignment between the transmitting and receiving signaling devices. The modified system further differs from the claimed invention in that the modified system does not include a modulate operable to modulate the received optical signal with modulation data for the first signaling device and a reflector operable to reflect the received optical signal back to the first signaling device. However, Gould teach a signaling device (figs. 2-3) comprising a modulate (figs. 2-3, modulator 52) operable to modulate the received optical signal with modulation data for the first signaling device and a retro-reflector (figs. 2-3, reflector 48) operable to reflect the received optical signal

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back to the first signaling device (column 4, lines 54-58). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate the signaling device taught by Gould into the second signaling device in the modified system in order to send responses from the receiving signaling device back to the transmitting signaling device.

As to claim 82, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a plurality of reflectors in the first signaling devices, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 83, the Examiner takes Official Notice that it would have been obvious for one of ordinary skill in the art at the time when the invention was made to arrange the plurality of reflector in an array in order to increase the packaging density of the optical elements.

Regarding claim 84, Takamatsu further teaches that the second signaling device further comprises a data retriever operable to retrieve the modulation data (fig. 3, element 45). The system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the first signaling device further comprises a modulator operable to modulate the light from said light source with modulation data. However, Gould teach a signaling device (figs. 2-3) comprising a modulate (figs. 2-3, modulator 52) operable to modulate the received optical signal with modulation data for the first signaling device (figs. 2-3, reflector 48; column 4, lines 54-58). Therefore, it

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would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate the signal modulation device taught by Gould into the first signaling device of Takamatsu in order to add information to be transmitted to the optical signal.

Regarding claim 85, Takamatsu further teaches that the first device further comprises a data retriever (fig. 3, element 45 in 40) operable to retrieve the modulation data received by the first device.

8. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takamatsu (U.S. Patent US 5,822,099) in view of Williams et al (U.S. Patent US 6,763,157 B1).

Regarding claim 54, the system of Takamatsu differs from the claimed invention in that Takamatsu does not specifically teach that the one or more of said signaling elements of said second signaling device comprises a vertical cavity surface emitting laser. However, a vertical cavity surface emitting laser is well known in the art. For example, Williams discloses that "integrated circuit technology allows large numbers of VCSEL (vertical cavity surface emitting) laser emitter optical transmitters" (column 1, lines 25-50). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a vertical cavity surface emitting laser in the system of Takamatsu in order to significantly increase the planar face density of optical devices.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Doucet et al. (U.S. Patent US 5,786,923) disclose a point-to-multipoint bi-directional free space optical communication system. Aoyama et al (U.S. Patent US 5,581,379) disclose a microlens array.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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